L22DC

Proponente:
INFRASTRUCTURE
ITALIA LAND 2 S.r.l.
Via del Bosco Rinnovato, 6
20057 – Assago (MI), Italia

Progetto Nuovo Data Center Campus Siziano

VALUTAZIONE IMPATTO AMBIENTALE
ai sensi del Titolo III del d.lgs. 152/2006

PUE MIL07

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Ingegnere
SACHA BUSETTI
ORDINE DEGLI
INGEGNERI DI
PAVIA

Legal Office:
DBA S.p.A.
Santo Stefano di Cadore
32045, Santo Stefano di Cadore (BL)
Italy
+39 0422 693511
dbaprogetti@pec.dbagroup.it
www.dbagroup.it

Branch Office:
DBA S.p.A.
Via Nattale Battaglia 10
20127, Milan
Italy
+39 0422 693511
dbaprogetti@pec.dbagroup.it

COMUNE DI SIZIANO

Principal:

STACK INFRASTRUCTURE

Project:
STACK INFRASTRUCTURE - MIL 07

MIL07-DBA-AZ-XX-CA-M-55050 **13038001**			Title: **Calculation** **PUE** **Annual and Peak**
PE0 - RIBA 4	**ITM**	**55050**	
Prog.	**D. De Bettin** **G. Russo**	**PM**	**A. Masiero**
BIMM	**S. Di Biase**	**BIMC**	**R. Sodano**

Rev	EDITED	CHECKED	APPROVED	DATE	DESCRIPTION
P02	DBA	LG	GR	07.11.2025	S5 - Riba Stage 4
P01	DBA	LG	GR	07.11.2025	S4 - RIBA 3

Client:	STACK INFRASTRUCTURE
Project	MIL07
Document:	Calculation - PUE - Annual and Peak
Document ID	MIL07-DBA-AZ-XX-CA-M-55050
Date	6-3-2026
Revision	P02

Phase 1 6 MW - Peak PUE

Description	[Value]	[UM]	Remarks
Design Data			
Design IT load	6000	kW	
Number of DM	1	[-]	
Design IT load per DM	6000	kW	
Summer ambient design temperature	43	°C	ASHRAE 2025 extreme climate condition n=20 (38,0) + 5°C
Winter ambient design temperature	-10,1	°C	ASHRAE 2025 extreme climate condition n=20
Supply critical chw temperature	23	°C	
Return critical chw temperature	33	°C	
Critical chw fluid type	Water	[-]	
Chiller type	Screw	[-]	
Chiller vendor	Carrier	[-]	
IT power consumed			
IT load	6000	kW	
Percentage of building load	100,00%	[-]	
Actual IT load	6000	kW	
Number of DM	1	[-]	
IT load per DM	6000	kW	
MMR load	10	kW	
Number of MMR	2	[-]	
Total MMR load	20	kW	
CER load	40	kW	
Number of CER	2	[-]	
Total CER load	80	kW	
Total IT power	**6100**	**kW**	
Mechanical systems consumptions			
Air cooled chillers with free-cooling	8	[-]	N+2; failure capacity: 1220 kW
Chiller consumption at design conditions in N+2	218	kW	Capacity 915 kW
Chiller pump consumption	20	kW	
Total chillers consumptions, pumps included	1906	kW	
Fan Wall units per DM	14	[-]	N+2; failure capacity: 540 kW
DM number	1	[-]	
DM Fan Wall consumption in N+2	27	kW	Capacity 463 kW
Total DM Fan Wall consumptions	378	kW	
CRAH units per LV1 electrical pod	2	[-]	N+1; failure capacity: 105 kW
LV1 electrical pod number	4	[-]	
LV1 electrical pod CRAH consumption in N+1	4	kW	Capacity 53 kW
Total LV1 electrical pod CRAH consumptions	32	kW	
CRAH units per LV2 electrical pod	2	[-]	N+1; failure capacity: 50 kW
LV2 electrical pod number	5	[-]	
LV2 electrical pod CRAH consumption in N+1	1,1	kW	Capacity 25 kW
Total LV2 electrical pod CRAH consumptions	11	kW	
CRAH units per CER	2	[-]	N+1; failure capacity: 40 kW
CER number	2	[-]	
CER CRAH consumption in N+1	1	kW	Capacity 20 kW
Total CER CRAH consumptions	4	kW	
Critical DOAS units	2	[-]	
DOAS consumption	40	kW	
Total DOAS consumptions	80	kW	
DX units per Battery	2	[-]	N+1; failure capacity: 5kW
Battery number	5	[-]	
Battery DX unit consumption	1,5	kW	
Total Battery DX units consumptions	15	kW	
DX units per Electrical Corridor	4	[-]	N+1; failure capacity: 10kW
Electrical Corridor number	1	[-]	
Electrical Corridor DX unit consumption	3	kW	
Total Electrical Corridor DX units consumptions	12	kW	
DX units per MMR	2	[-]	N+1; failure capacity: 10kW
MMR number	2	[-]	
MMR DX unit consumption	3	kW	
Total MMR DX units consumptions	12	kW	
Other critical mechanical loads	30	kW	
Non critical mechanical loads	150	kW	
Total mechanical systems consumptions	**2630**	**kW**	
Electrical systems losses			
UPS losses	3,20%	[-]	
	230	kW	UPS for IT load (2*3*1000kW), mechanical pumps and air handling units for continous cooling (1*4*300kW)
IT distribution losses	1,00%	[-]	
	61	kW	
Mechanical distribution losses	1,00%	[-]	
	26	kW	
MV transformers losses	1,10%	[-]	
	100	kW	
Total electrical losses	**417**	**kW**	
Peak PUE calculation			
Total IT power	6100	kW	
Total power consumed	9148	kW	
Peak PUE	**1,500**		

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Phase 1 6 MW - Annual PUE

Description	[Value]	[UM]	Remarks
Design Data			
Design IT load	6000	kW	
Number of DM	1	[-]	
Design IT load per DM	6000	kW	
Summer ambient design temperature	43	°C	ASHRAE 2025 extreme climate condition n=20 (38,0) + 5°C
Winter ambient design temperature	-10,1	°C	ASHRAE 2025 extreme climate condition n=20
Supply critical chw temperature	23	°C	
Return critical chw temperature	33	°C	
Critical chw fluid type	Water	[-]	
Chiller type	Screw	[-]	
Chiller vendor	Carrier	[-]	
Calculation hours	8760	h	
IT power consumed (assumed static)			
IT load	6000	kW	
Percentage of building load	100,00%	[-]	
Actual IT load	52560000	kWh	
Number of DM	1	[-]	
IT load per DM	52560000	kWh	
MMR load	10	kW	
Number of MMR	2	[-]	
Total MMR load	175200	kWh	
CER load	40	kW	
Number of CER	2	[-]	
Total CER load	700800	kWh	
Total IT power	**53436000**	**kWh**	
Mechanical systems consumptions			
Air cooled chillers with free-cooling and glycol loop	8	[-]	N+2; failure capacity: 1220 kW
Chiller consumption at design conditions in N+2	456443	kWh	Capacity 915 kW
Chiller pump consumption	20	kW	Assumed static
Total chillers consumptions, pumps included	5053143	kWh	
Fan Wall units per DM	14	[-]	N+2; failure capacity: 540 kW
DM number	1	[-]	
DM Fan Wall consumption in N+2	27	kW	Capacity 463 kW
Total DM Fan Wall consumptions	3311280	kWh	Assumed static
CRAH units per LV1 electrical pod	2	[-]	N+1; failure capacity: 105 kW
LV1 electrical pod number	4	[-]	
LV1 electrical pod CRAH consumption in N+1	4	kW	Capacity 53 kW
Total LV1 electrical pod CRAH consumptions	280320	kWh	Assumed static
CRAH units per LV2 electrical pod	2	[-]	N+1; failure capacity: 50 kW
LV2 electrical pod number	5	[-]	
LV2 electrical pod CRAH consumption in N+1	1,1	kW	Capacity 25 kW
Total LV2 electrical pod CRAH consumptions	96360	kWh	Assumed static
CRAH units per CER	2	[-]	N+1; failure capacity: 40 kW
CER number	2	[-]	
CER CRAH consumption in N+1	1	kW	Capacity 20 kW
Total CER CRAH consumptions	35040	kWh	Assumed static
Critical DOAS units	2	[-]	
DOAS consumption	40	kW	
Total DOAS consumptions	700800	kWh	Assumed static
DX units per Battery	2	[-]	N+1; failure capacity: 5kW
Battery number	5	[-]	
Battery DX unit consumption	1,5	kW	
Total Battery DX units consumptions	131400	kWh	Assumed static
DX units per Electrical Corridor	4	[-]	N+1; failure capacity: 10kW
Electrical Corridor number	1	[-]	
Electrical Corridor DX unit consumption	3	kW	
Total Electrical Corridor DX units consumptions	105120	kWh	Assumed static
DX units per MMR	2	[-]	N+1; failure capacity: 10kW
MMR number	2	[-]	
MMR DX unit consumption	3	kW	
Total MMR DX units consumptions	105120	kWh	Assumed static
Other critical mechanical loads	262800	kWh	Assumed static
Non critical mechanical loads	1314000	kWh	Assumed static
Total mechanical systems consumptions	**11395383**	**kWh**	
Electrical systems losses (assumed static)			
UPS losses	3,20%	[-]	
	2018304	kWh	UPS for IT load (2*3*1000kW), mechanical pumps and air handling units for continous cooling (1*4*300kW)
IT distribution losses	1,00%	[-]	
	534360	kWh	
Mechanical distribution losses	1,00%	[-]	
	113954	kWh	
MV transformers losses	1,10%	[-]	
	742478	kWh	
Total electrical losses	**3409096**	**kWh**	
Annual PUE calculation			
Total IT power	53436000	kWh	
Total power consumed	68240479	kWh	
Annual PUE	**1,277**		

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Phase 2 12 MW - Peak PUE

Description	[Value]	[UM]	Remarks
Design Data			
Design IT load	12000	kW	
Number of DM	2	[-]	
Design IT load per DM	6000	kW	
Summer ambient design temperature	43	°C	ASHRAE 2025 extreme climate condition n=20 (38,0) + 5°C
Winter ambient design temperature	-10,1	°C	ASHRAE 2025 extreme climate condition n=20
Supply critical chw temperature	23	°C	
Return critical chw temperature	33	°C	
Critical chw fluid type	Water	[-]	
Chiller type	Screw	[-]	
Chiller vendor	Carrier	[-]	
IT power consumed			
IT load	12000	kW	
Percentage of building load	100,00%	[-]	
Actual IT load	12000	kW	
Number of DM	2	[-]	
IT load per DM	6000	kW	
MMR load	10	kW	
Number of MMR	2	[-]	
Total MMR load	20	kW	
CER load	40	kW	
Number of CER	2	[-]	
Total CER load	80	kW	
Total IT power	**12100**	**kW**	
Mechanical systems consumptions			
Air cooled chillers with free-cooling	14	[-]	N+2; failure capacity: 1220 kW
Chiller consumption at design conditions in N+2	252	kW	Capacity 1045 kW
Chiller pump consumption	20	kW	
Total chillers consumptions, pumps included	3805	kW	
Fan Wall units per DM	14	[-]	N+2; failure capacity: 540 kW
DM number	2	[-]	
DM Fan Wall consumption in N+2	27	kW	Capacity 463 kW
Total DM Fan Wall consumptions	756	kW	
CRAH units per LV1 electrical pod	2	[-]	N+1; failure capacity: 105 kW
LV1 electrical pod number	7	[-]	
LV1 electrical pod CRAH consumption in N+1	4	kW	Capacity 53 kW
Total LV1 electrical pod CRAH consumptions	56	kW	
CRAH units per LV2 electrical pod	2	[-]	N+1; failure capacity: 50 kW
LV2 electrical pod number	8	[-]	
LV2 electrical pod CRAH consumption in N+1	1,1	kW	Capacity 25 kW
Total LV2 electrical pod CRAH consumptions	18	kW	
CRAH units per CER	2	[-]	N+1; failure capacity: 40 kW
CER number	2	[-]	
CER CRAH consumption in N+1	1	kW	Capacity 20 kW
Total CER CRAH consumptions	4	kW	
Critical DOAS units	2	[-]	
DOAS consumption	40	kW	
Total DOAS consumptions	80	kW	
DX units per Battery	2	[-]	N+1; failure capacity: 5kW
Battery number	8	[-]	
Battery DX unit consumption	1,5	kW	
Total Battery DX units consumptions	24	kW	
DX units per Electrical Corridor	4	[-]	N+1; failure capacity: 10kW
Electrical Corridor number	2	[-]	
Electrical Corridor DX unit consumption	3	kW	
Total Electrical Corridor DX units consumptions	24	kW	
DX units per MMR	2	[-]	N+1; failure capacity: 10kW
MMR number	2	[-]	
MMR DX unit consumption	3	kW	
Total MMR DX units consumptions	12	kW	
Other critical mechanical loads	40	kW	
Non critical mechanical loads	150	kW	
Total mechanical systems consumptions	**4968**	**kW**	
Electrical systems losses			
UPS losses	3,20%	[-]	
	451	kW	UPS for IT load (2*6*1000kW), mechanical pumps and air handling units for continous cooling (1*7*300kW)
IT distribution losses	1,00%	[-]	
	121	kW	
Mechanical distribution losses	1,00%	[-]	
	50	kW	
MV transformers losses	1,10%	[-]	
	195	kW	
Total electrical losses	**816**	**kW**	
Peak PUE calculation			
Total IT power	12100	kW	
Total power consumed	17885	kW	
Peak PUE	**1,478**		

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Phase 2 12 MW - Annual PUE

Description	[Value]	[UM]	Remarks
Design Data			
Design IT load	12000	kW	
Number of DM	2	[-]	
Design IT load per DM	6000	kW	
Summer ambient design temperature	43	°C	ASHRAE 2025 extreme climate condition n=20 (38,0) + 5°C
Winter ambient design temperature	-10,1	°C	ASHRAE 2025 extreme climate condition n=20
Supply critical chw temperature	23	°C	
Return critical chw temperature	33	°C	
Critical chw fluid type	Water	[-]	
Chiller type	Screw	[-]	
Chiller vendor	Carrier	[-]	
Calculation hours	8760	h	
IT power consumed (assumed static)			
IT load	12000	kW	
Percentage of building load	100,00%	[-]	
Actual IT load	105120000	kWh	
Number of DM	2	[-]	
IT load per DM	52560000	kWh	
MMR load	10	kW	
Number of MMR	2	[-]	
Total MMR load	175200	kWh	
CER load	40	kW	
Number of CER	2	[-]	
Total CER load	700800	kWh	
Total IT power	**105996000**	**kWh**	
Mechanical systems consumptions			
Air cooled chillers with free-cooling and glycol loop	14	[-]	N+2; failure capacity: 1220 kW
Chiller consumption at design conditions in N+2	537622	kWh	Capacity 1045 kW
Chiller pump consumption	20	kW	Assumed static
Total chillers consumptions, pumps included	9979512	kWh	
Fan Wall units per DM	14	[-]	N+2; failure capacity: 540 kW
DM number	2	[-]	
DM Fan Wall consumption in N+2	27	kW	Capacity 463 kW
Total DM Fan Wall consumptions	6622560	kWh	Assumed static
CRAH units per LV1 electrical pod	2	[-]	N+1; failure capacity: 105 kW
LV1 electrical pod number	7	[-]	
LV1 electrical pod CRAH consumption in N+1	4	kW	Capacity 53 kW
Total LV1 electrical pod CRAH consumptions	490560	kWh	Assumed static
CRAH units per LV2 electrical pod	2	[-]	N+1; failure capacity: 50 kW
LV2 electrical pod number	8	[-]	
LV2 electrical pod CRAH consumption in N+1	1,1	kW	Capacity 25 kW
Total LV2 electrical pod CRAH consumptions	154176	kWh	Assumed static
CRAH units per CER	2	[-]	N+1; failure capacity: 40 kW
CER number	2	[-]	
CER CRAH consumption in N+1	1	kW	Capacity 20 kW
Total CER CRAH consumptions	35040	kWh	Assumed static
Critical DOAS units	2	[-]	
DOAS consumption	40	kW	
Total DOAS consumptions	700800	kWh	Assumed static
DX units per Battery	2	[-]	N+1; failure capacity: 5kW
Battery number	8	[-]	
Battery DX unit consumption	1,5	kW	
Total Battery DX units consumptions	210240	kWh	Assumed static
DX units per Electrical Corridor	4	[-]	N+1; failure capacity: 10kW
Electrical Corridor number	2	[-]	
Electrical Corridor DX unit consumption	3	kW	
Total Electrical Corridor DX units consumptions	210240	kWh	Assumed static
DX units per MMR	2	[-]	N+1; failure capacity: 10kW
MMR number	2	[-]	
MMR DX unit consumption	3	kW	
Total MMR DX units consumptions	105120	kWh	Assumed static
Other critical mechanical loads	350400	kWh	Assumed static
Non critical mechanical loads	1314000	kWh	Assumed static
Total mechanical systems consumptions	**20172648**	**kWh**	
Electrical systems losses (assumed static)			
UPS losses	3,20%	[-]	
	3952512	kWh	UPS for IT load (2*6*1000kW), mechanical pumps and air handling units for continous cooling (1*7*300kW)
IT distribution losses	1,00%	[-]	
	1059960	kWh	
Mechanical distribution losses	1,00%	[-]	
	201726	kWh	
MV transformers losses	1,10%	[-]	
	1445211	kWh	
Total electrical losses	**6659410**	**kWh**	
Annual PUE calculation			
Total IT power	105996000	kWh	
Total power consumed	132828058	kWh	
Annual PUE	**1.253**		

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Phase 2 12 MW 25% - Peak PUE

Description	[Value]	[UM]	Remarks
Design Data			
Design IT load	12000	kW	
Number of DM	2	[-]	
Design IT load per DM	6000	kW	
Summer ambient design temperature	43	°C	ASHRAE 2025 extreme climate condition n=20 (38,0) + 5°C
Winter ambient design temperature	-10,1	°C	ASHRAE 2025 extreme climate condition n=20
Supply critical chw temperature	23	°C	
Return critical chw temperature	33	°C	
Critical chw fluid type	Water	[-]	
Chiller type	Screw	[-]	
Chiller vendor	Carrier	[-]	
IT power consumed			
IT load	12000	kW	
Percentage of building load	25,00%	[-]	
Actual IT load	3000	kW	
Number of DM	2	[-]	
IT load per DM	1500	kW	
MMR load	10	kW	
Number of MMR	2	[-]	
Total MMR load	20	kW	
CER load	40	kW	
Number of CER	2	[-]	
Total CER load	80	kW	
Total IT power	**3100**	**kW**	
Mechanical systems consumptions			
Air cooled chillers with free-cooling	14	[-]	N+2; failure capacity: 1220 kW
Chiller consumption at design conditions in N+2	67	kW	Capacity 261 kW
Chiller pump consumption	10	kW	
Total chillers consumptions, pumps included	1079	kW	
Fan Wall units per DM	14	[-]	N+2; failure capacity: 540 kW
DM number	2	[-]	
DM Fan Wall consumption in N+2	6	kW	Capacity 116 kW
Total DM Fan Wall consumptions	168	kW	
CRAH units per LV1 electrical pod	2	[-]	N+1; failure capacity: 105 kW
LV1 electrical pod number	7	[-]	
LV1 electrical pod CRAH consumption in N+1	4	kW	Capacity 53 kW
Total LV1 electrical pod CRAH consumptions	56	kW	
CRAH units per LV2 electrical pod	2	[-]	N+1; failure capacity: 50 kW
LV2 electrical pod number	8	[-]	
LV2 electrical pod CRAH consumption in N+1	1,1	kW	Capacity 25 kW
Total LV2 electrical pod CRAH consumptions	18	kW	
CRAH units per CER	2	[-]	N+1; failure capacity: 40 kW
CER number	2	[-]	
CER CRAH consumption in N+1	1	kW	Capacity 20 kW
Total CER CRAH consumptions	4	kW	
Critical DOAS units	2	[-]	
DOAS consumption	40	kW	
Total DOAS consumptions	80	kW	
DX units per Battery	2	[-]	N+1; failure capacity: 5kW
Battery number	8	[-]	
Battery DX unit consumption	1,5	kW	
Total Battery DX units consumptions	24	kW	
DX units per Electrical Corridor	4	[-]	N+1; failure capacity: 10kW
Electrical Corridor number	2	[-]	
Electrical Corridor DX unit consumption	3	kW	
Total Electrical Corridor DX units consumptions	24	kW	
DX units per MMR	2	[-]	N+1; failure capacity: 10kW
MMR number	2	[-]	
MMR DX unit consumption	3	kW	
Total MMR DX units consumptions	12	kW	
Other critical mechanical loads	40	kW	
Non critical mechanical loads	150	kW	
Total mechanical systems consumptions	**1655**	**kW**	
Electrical systems losses			
UPS losses	3,20%	[-]	
	113	kW	UPS for IT load (2*6*250kW), mechanical pumps and air handling units for continous cooling (1*7*75kW)
IT distribution losses	1,00%	[-]	
	31	kW	
Mechanical distribution losses	1,00%	[-]	
	17	kW	
MV transformers losses	1,10%	[-]	
	54	kW	
Total electrical losses	**214**	**kW**	
Peak PUE calculation			
Total IT power	3100	kW	
Total power consumed	4969	kW	
Peak PUE	**1,603**		

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Phase 2 12 MW 25% - Annual PUE

Description	[Value]	[UM]	Remarks
Design Data			
Design IT load	12000	kW	
Number of DM	2	[-]	
Design IT load per DM	6000	kW	
Summer ambient design temperature	43	°C	ASHRAE 2025 extreme climate condition n=20 (38,0) + 5°C
Winter ambient design temperature	-10,1	°C	ASHRAE 2025 extreme climate condition n=20
Supply critical chw temperature	23	°C	
Return critical chw temperature	33	°C	
Critical chw fluid type	Water	[-]	
Chiller type	Screw	[-]	
Chiller vendor	Carrier	[-]	
Calculation hours	8760	h	
IT power consumed (assumed static)			
IT load	12000	kW	
Percentage of building load	25,00%	[-]	
Actual IT load	26280000	kWh	
Number of DM	2	[-]	
IT load per DM	13140000	kWh	
MMR load	10	kW	
Number of MMR	2	[-]	
Total MMR load	175200	kWh	
CER load	40	kW	
Number of CER	2	[-]	
Total CER load	700800	kWh	
Total IT power	**27156000**	**kWh**	
Mechanical systems consumptions			
Air cooled chillers with free-cooling and glycol loop	14	[-]	N+2; failure capacity: 1220 kW
Chiller consumption at design conditions in N+2	164350	kWh	Capacity 261 kW
Chiller pump consumption	10	kW	Assumed static
Total chillers consumptions, pumps included	3527297	kWh	
Fan Wall units per DM	14	[-]	N+2; failure capacity: 540 kW
DM number	2	[-]	
DM Fan Wall consumption in N+2	6	kW	Capacity 116 kW
Total DM Fan Wall consumptions	1471680	kWh	Assumed static
CRAH units per LV1 electrical pod	2	[-]	N+1; failure capacity: 105 kW
LV1 electrical pod number	7	[-]	
LV1 electrical pod CRAH consumption in N+1	4	kW	Capacity 53 kW
Total LV1 electrical pod CRAH consumptions	490560	kWh	Assumed static
CRAH units per LV2 electrical pod	2	[-]	N+1; failure capacity: 50 kW
LV2 electrical pod number	8	[-]	
LV2 electrical pod CRAH consumption in N+1	1,1	kW	Capacity 25 kW
Total LV2 electrical pod CRAH consumptions	154176	kWh	Assumed static
CRAH units per CER	2	[-]	N+1; failure capacity: 40 kW
CER number	2	[-]	
CER CRAH consumption in N+1	1	kW	Capacity 20 kW
Total CER CRAH consumptions	35040	kWh	Assumed static
Critical DOAS units	2	[-]	
DOAS consumption	40	kW	
Total DOAS consumptions	700800	kWh	Assumed static
DX units per Battery	2	[-]	N+1; failure capacity: 5kW
Battery number	8	[-]	
Battery DX unit consumption	1,5	kW	
Total Battery DX units consumptions	210240	kWh	Assumed static
DX units per Electrical Corridor	4	[-]	N+1; failure capacity: 10kW
Electrical Corridor number	2	[-]	
Electrical Corridor DX unit consumption	3	kW	
Total Electrical Corridor DX units consumptions	210240	kWh	Assumed static
DX units per MMR	2	[-]	N+1; failure capacity: 10kW
MMR number	2	[-]	
MMR DX unit consumption	3	kW	
Total MMR DX units consumptions	105120	kWh	Assumed static
Other critical mechanical loads	350400	kWh	Assumed static
Non critical mechanical loads	1314000	kWh	Assumed static
Total mechanical systems consumptions	**8569553**	**kWh**	
Electrical systems losses (assumed static)			
UPS losses	3,20%	[-]	
	988128	kWh	UPS for IT load (2*6*250kW), mechanical pumps and air handling units for continous cooling (1*7*75kW)
IT distribution losses	1,00%	[-]	
	271560	kWh	
Mechanical distribution losses	1,00%	[-]	
	85696	kWh	
MV transformers losses	1,10%	[-]	
	407780	kWh	
Total electrical losses	**1753164**	**kWh**	
Annual PUE calculation			
Total IT power	27156000	kWh	
Total power consumed	37478717	kWh	
Annual PUE	**1,380**		

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Phase 2 12 MW 50% - Peak PUE

Description	[Value]	[UM]	Remarks
Design Data			
Design IT load	12000	kW	
Number of DM	2	[-]	
Design IT load per DM	6000	kW	
Summer ambient design temperature	43	°C	ASHRAE 2025 extreme climate condition n=20 (38,0) + 5°C
Winter ambient design temperature	-10,1	°C	ASHRAE 2025 extreme climate condition n=20
Supply critical chw temperature	23	°C	
Return critical chw temperature	33	°C	
Critical chw fluid type	Water	[-]	
Chiller type	Screw	[-]	
Chiller vendor	Carrier	[-]	
IT power consumed			
IT load	12000	kW	
Percentage of building load	50,00%	[-]	
Actual IT load	6000	kW	
Number of DM	2	[-]	
IT load per DM	3000	kW	
MMR load	10	kW	
Number of MMR	2	[-]	
Total MMR load	20	kW	
CER load	40	kW	
Number of CER	2	[-]	
Total CER load	80	kW	
Total IT power	**6100**	**kW**	
Mechanical systems consumptions			
Air cooled chillers with free-cooling	14	[-]	N+2; failure capacity: 1220 kW
Chiller consumption at design conditions in N+2	123	kW	Capacity 523 kW
Chiller pump consumption	13	kW	
Total chillers consumptions, pumps included	1905	kW	
Fan Wall units per DM	14	[-]	N+2; failure capacity: 540 kW
DM number	2	[-]	
DM Fan Wall consumption in N+2	9	kW	Capacity 231 kW
Total DM Fan Wall consumptions	252	kW	
CRAH units per LV1 electrical pod	2	[-]	N+1; failure capacity: 105 kW
LV1 electrical pod number	7	[-]	
LV1 electrical pod CRAH consumption in N+1	4	kW	Capacity 53 kW
Total LV1 electrical pod CRAH consumptions	56	kW	
CRAH units per LV2 electrical pod	2	[-]	N+1; failure capacity: 50 kW
LV2 electrical pod number	8	[-]	
LV2 electrical pod CRAH consumption in N+1	1,1	kW	Capacity 25 kW
Total LV2 electrical pod CRAH consumptions	18	kW	
CRAH units per CER	2	[-]	N+1; failure capacity: 40 kW
CER number	2	[-]	
CER CRAH consumption in N+1	1	kW	Capacity 20 kW
Total CER CRAH consumptions	4	kW	
Critical DOAS units	2	[-]	
DOAS consumption	40	kW	
Total DOAS consumptions	80	kW	
DX units per Battery	2	[-]	N+1; failure capacity: 5kW
Battery number	8	[-]	
Battery DX unit consumption	1,5	kW	
Total Battery DX units consumptions	24	kW	
DX units per Electrical Corridor	4	[-]	N+1; failure capacity: 10kW
Electrical Corridor number	2	[-]	
Electrical Corridor DX unit consumption	3	kW	
Total Electrical Corridor DX units consumptions	24	kW	
DX units per MMR	2	[-]	N+1; failure capacity: 10kW
MMR number	2	[-]	
MMR DX unit consumption	3	kW	
Total MMR DX units consumptions	12	kW	
Other critical mechanical loads	40	kW	
Non critical mechanical loads	150	kW	
Total mechanical systems consumptions	**2565**	**kW**	
Electrical systems losses			
UPS losses	3,20%	[-]	
	226	kW	UPS for IT load (2*6*500kW), mechanical pumps and air handling units for continous cooling (1*7*150kW)
IT distribution losses	1,00%	[-]	
	61	kW	
Mechanical distribution losses	1,00%	[-]	
	26	kW	
MV transformers losses	1,10%	[-]	
	99	kW	
Total electrical losses	**411**	**kW**	
Peak PUE calculation			
Total IT power	6100	kW	
Total power consumed	9076	kW	
Peak PUE	**1,488**		

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Phase 2 12 MW 50% - Annual PUE

Description	[Value]	[UM]	Remarks
Design Data			
Design IT load	12000	kW	
Number of DM	2	[-]	
Design IT load per DM	6000	kW	
Summer ambient design temperature	43	°C	ASHRAE 2025 extreme climate condition n=20 (38,0) + 5°C
Winter ambient design temperature	-10,1	°C	ASHRAE 2025 extreme climate condition n=20
Supply critical chw temperature	23	°C	
Return critical chw temperature	33	°C	
Critical chw fluid type	Water	[-]	
Chiller type	Screw	[-]	
Chiller vendor	Carrier	[-]	
Calculation hours	8760	h	
IT power consumed (assumed static)			
IT load	12000	kW	
Percentage of building load	50,00%	[-]	
Actual IT load	52560000	kWh	
Number of DM	2	[-]	
IT load per DM	26280000	kWh	
MMR load	10	kW	
Number of MMR	2	[-]	
Total MMR load	175200	kWh	
CER load	40	kW	
Number of CER	2	[-]	
Total CER load	700800	kWh	
Total IT power	**53436000**	**kWh**	
Mechanical systems consumptions			
Air cooled chillers with free-cooling and glycol loop	14	[-]	N+2; failure capacity: 1220 kW
Chiller consumption at design conditions in N+2	243856	kWh	Capacity 523 kW
Chiller pump consumption	10	kW	Assumed static
Total chillers consumptions, pumps included	4640381	kWh	
Fan Wall units per DM	14	[-]	N+2; failure capacity: 540 kW
DM number	2	[-]	
DM Fan Wall consumption in N+2	9	kW	Capacity 231 kW
Total DM Fan Wall consumptions	2207520	kWh	Assumed static
CRAH units per LV1 electrical pod	2	[-]	N+1; failure capacity: 105 kW
LV1 electrical pod number	7	[-]	
LV1 electrical pod CRAH consumption in N+1	4	kW	Capacity 53 kW
Total LV1 electrical pod CRAH consumptions	490560	kWh	Assumed static
CRAH units per LV2 electrical pod	2	[-]	N+1; failure capacity: 50 kW
LV2 electrical pod number	8	[-]	
LV2 electrical pod CRAH consumption in N+1	1,1	kW	Capacity 25 kW
Total LV2 electrical pod CRAH consumptions	154176	kWh	Assumed static
CRAH units per CER	2	[-]	N+1; failure capacity: 40 kW
CER number	2	[-]	
CER CRAH consumption in N+1	1	kW	Capacity 20 kW
Total CER CRAH consumptions	35040	kWh	Assumed static
Critical DOAS units	2	[-]	
DOAS consumption	40	kW	
Total DOAS consumptions	700800	kWh	Assumed static
DX units per Battery	2	[-]	N+1; failure capacity: 5kW
Battery number	8	[-]	
Battery DX unit consumption	1,5	kW	
Total Battery DX units consumptions	210240	kWh	Assumed static
DX units per Electrical Corridor	4	[-]	N+1; failure capacity: 10kW
Electrical Corridor number	2	[-]	
Electrical Corridor DX unit consumption	3	kW	
Total Electrical Corridor DX units consumptions	210240	kWh	Assumed static
DX units per MMR	2	[-]	N+1; failure capacity: 10kW
MMR number	2	[-]	
MMR DX unit consumption	3	kW	
Total MMR DX units consumptions	105120	kWh	Assumed static
Other critical mechanical loads	350400	kWh	Assumed static
Non critical mechanical loads	1314000	kWh	Assumed static
Total mechanical systems consumptions	**10418477**	**kWh**	
Electrical systems losses (assumed static)			
UPS losses	3,20%	[-]	
	1976256	kWh	UPS for IT load (2*6*500kW), mechanical pumps and air handling units for continous cooling (1*7*150kW)
IT distribution losses	1,00%	[-]	
	534360	kWh	
Mechanical distribution losses	1,00%	[-]	
	104185	kWh	
MV transformers losses	1,10%	[-]	
	731162	kWh	
Total electrical losses	**3345963**	**kWh**	
Annual PUE calculation			
Total IT power	53436000	kWh	
Total power consumed	67200440	kWh	
Annual PUE	**1,258**		

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Phase 2 12 MW 75% - Peak PUE

Description	[Value]	[UM]	Remarks
Design Data			
Design IT load	12000	kW	
Number of DM	2	[-]	
Design IT load per DM	6000	kW	
Summer ambient design temperature	43	°C	ASHRAE 2025 extreme climate condition n=20 (38,0) + 5°C
Winter ambient design temperature	-10,1	°C	ASHRAE 2025 extreme climate condition n=20
Supply critical chw temperature	23	°C	
Return critical chw temperature	33	°C	
Critical chw fluid type	Water	[-]	
Chiller type	Screw	[-]	
Chiller vendor	Carrier	[-]	
IT power consumed			
IT load	12000	kW	
Percentage of building load	75,00%	[-]	
Actual IT load	9000	kW	
Number of DM	2	[-]	
IT load per DM	4500	kW	
MMR load	10	kW	
Number of MMR	2	[-]	
Total MMR load	20	kW	
CER load	40	kW	
Number of CER	2	[-]	
Total CER load	80	kW	
Total IT power	**9100**	**kW**	
Mechanical systems consumptions			
Air cooled chillers with free-cooling	14	[-]	N+2; failure capacity: 1220 kW
Chiller consumption at design conditions in N+2	185	kW	Capacity 784 kW
Chiller pump consumption	15	kW	
Total chillers consumptions, pumps included	2805	kW	
Fan Wall units per DM	14	[-]	N+2; failure capacity: 540 kW
DM number	2	[-]	
DM Fan Wall consumption in N+2	14	kW	Capacity 347 kW
Total DM Fan Wall consumptions	392	kW	
CRAH units per LV1 electrical pod	2	[-]	N+1; failure capacity: 105 kW
LV1 electrical pod number	7	[-]	
LV1 electrical pod CRAH consumption in N+1	4	kW	Capacity 53 kW
Total LV1 electrical pod CRAH consumptions	56	kW	
CRAH units per LV2 electrical pod	2	[-]	N+1; failure capacity: 50 kW
LV2 electrical pod number	8	[-]	
LV2 electrical pod CRAH consumption in N+1	1,1	kW	Capacity 25 kW
Total LV2 electrical pod CRAH consumptions	18	kW	
CRAH units per CER	2	[-]	N+1; failure capacity: 40 kW
CER number	2	[-]	
CER CRAH consumption in N+1	1	kW	Capacity 20 kW
Total CER CRAH consumptions	4	kW	
Critical DOAS units	2	[-]	
DOAS consumption	40	kW	
Total DOAS consumptions	80	kW	
DX units per Battery	2	[-]	N+1; failure capacity: 5kW
Battery number	8	[-]	
Battery DX unit consumption	1,5	kW	
Total Battery DX units consumptions	24	kW	
DX units per Electrical Corridor	4	[-]	N+1; failure capacity: 10kW
Electrical Corridor number	2	[-]	
Electrical Corridor DX unit consumption	3	kW	
Total Electrical Corridor DX units consumptions	24	kW	
DX units per MMR	2	[-]	N+1; failure capacity: 10kW
MMR number	2	[-]	
MMR DX unit consumption	3	kW	
Total MMR DX units consumptions	12	kW	
Other critical mechanical loads	40	kW	
Non critical mechanical loads	150	kW	
Total mechanical systems consumptions	**3604**	**kW**	
Electrical systems losses			
UPS losses	3,20%	[-]	
	338	kW	UPS for IT load (2*6*750kW), mechanical pumps and air handling units for continous cooling (1*7*225kW)
IT distribution losses	1,00%	[-]	
	91	kW	
Mechanical distribution losses	1,00%	[-]	
	36	kW	
MV transformers losses	1,10%	[-]	
	145	kW	
Total electrical losses	**610**	**kW**	
Peak PUE calculation			
Total IT power	9100	kW	
Total power consumed	13314	kW	
Peak PUE	**1,463**		

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Phase 2 12 MW 75% - Annual PUE

Description	[Value]	[UM]	Remarks
Design Data			
Design IT load	12000	kW	
Number of DM	2	[-]	
Design IT load per DM	6000	kW	
Summer ambient design temperature	43	°C	ASHRAE 2025 extreme climate condition n=20 (38,0) + 5°C
Winter ambient design temperature	-10,1	°C	ASHRAE 2025 extreme climate condition n=20
Supply critical chw temperature	23	°C	
Return critical chw temperature	33	°C	
Critical chw fluid type	Water	[-]	
Chiller type	Screw	[-]	
Chiller vendor	Carrier	[-]	
Calculation hours	8760	h	
IT power consumed (assumed static)			
IT load	12000	kW	
Percentage of building load	75,00%	[-]	
Actual IT load	78840000	kWh	
Number of DM	2	[-]	
IT load per DM	39420000	kWh	
MMR load	10	kW	
Number of MMR	2	[-]	
Total MMR load	175200	kWh	
CER load	40	kW	
Number of CER	2	[-]	
Total CER load	700800	kWh	
Total IT power	**79716000**	**kWh**	
Mechanical systems consumptions			
Air cooled chillers with free-cooling and glycol loop	14	[-]	N+2; failure capacity: 1220 kW
Chiller consumption at design conditions in N+2	379125	kWh	Capacity 784 kW
Chiller pump consumption	15	kW	Assumed static
Total chillers consumptions, pumps included	7147351	kWh	
Fan Wall units per DM	14	[-]	N+2; failure capacity: 540 kW
DM number	2	[-]	
DM Fan Wall consumption in N+2	14	kW	Capacity 347 kW
Total DM Fan Wall consumptions	3433920	kWh	Assumed static
CRAH units per LV1 electrical pod	2	[-]	N+1; failure capacity: 105 kW
LV1 electrical pod number	7	[-]	
LV1 electrical pod CRAH consumption in N+1	4	kW	Capacity 53 kW
Total LV1 electrical pod CRAH consumptions	490560	kWh	Assumed static
CRAH units per LV2 electrical pod	2	[-]	N+1; failure capacity: 50 kW
LV2 electrical pod number	8	[-]	
LV2 electrical pod CRAH consumption in N+1	1,1	kW	Capacity 25 kW
Total LV2 electrical pod CRAH consumptions	154176	kWh	Assumed static
CRAH units per CER	2	[-]	N+1; failure capacity: 40 kW
CER number	2	[-]	
CER CRAH consumption in N+1	1	kW	Capacity 20 kW
Total CER CRAH consumptions	35040	kWh	Assumed static
Critical DOAS units	2	[-]	
DOAS consumption	40	kW	
Total DOAS consumptions	700800	kWh	Assumed static
DX units per Battery	2	[-]	N+1; failure capacity: 5kW
Battery number	8	[-]	
Battery DX unit consumption	1,5	kW	
Total Battery DX units consumptions	210240	kWh	Assumed static
DX units per Electrical Corridor	4	[-]	N+1; failure capacity: 10kW
Electrical Corridor number	2	[-]	
Electrical Corridor DX unit consumption	3	kW	
Total Electrical Corridor DX units consumptions	210240	kWh	Assumed static
DX units per MMR	2	[-]	N+1; failure capacity: 10kW
MMR number	2	[-]	
MMR DX unit consumption	3	kW	
Total MMR DX units consumptions	105120	kWh	Assumed static
Other critical mechanical loads	350400	kWh	Assumed static
Non critical mechanical loads	1314000	kWh	Assumed static
Total mechanical systems consumptions	**14151847**	**kWh**	
Electrical systems losses (assumed static)			
UPS losses	3,20%	[-]	
	2964384	kWh	UPS for IT load (2*6*750kW), mechanical pumps and air handling units for continous cooling (1*7*225kW)
IT distribution losses	1,00%	[-]	
	797160	kWh	
Mechanical distribution losses	1,00%	[-]	
	141518	kWh	
MV transformers losses	1,10%	[-]	
	1075480	kWh	
Total electrical losses	**4978542**	**kWh**	
Annual PUE calculation			
Total IT power	79716000	kWh	
Total power consumed	98846390	kWh	
Annual PUE	**1,240**		